Code= 2334
Oct = 2017

M.SC. (Sem II) Examination
Statistics: Paper – VI
(Testing of Hypothesis)
(Inference – II)

Time : 2 Hours] **[Total Marks : 70**

1. **(a):** Explain randomized tests. **State Neyman-Pearson lemma and prove the necessity part the theorem for randomized test.**

(b)) Derive size – α UMP test to test H: $p = p_0$ against K: $p \leq p_0$ based on a random sample of size n taken from Bernoulli distribution with parameter p. Also obtain power function of the test

OR

1. **(a) Giving suitable illustration explain the terms:**

(i) Null hypothesis (ii) Simple hypothesis (iii) Composite hypothesis (iv) Non-Randomized test (v) Randomized test.

(b) Show that the test given by N.P. lemma is always unbiased

2. **(a) Giving suitable illustration explain the terms (i) Parametric tests and Non- parametric tests**

(ii) size of the test and level of the test.

(iii) Most powerful test (iv) Uniformly most powerful (UMP) Tests,

(b) Let X~N(μ,1). Test the null hypothesis H:μ=6 v/s K:μ=7.
Two actions are given.
A-1: Accept H if X<7
A-2: Accept K if X≥7.
Find probability of wrong decision w.r.t. both the actions.

OR

2. **(a) Discuss the Uniformly Most Powerful test and comment on its existence. Show that for a family C(θ)h(x) Exp(Q(θ) T(x)) there exists a UMP test for testing H0: θ≤θ0 against H1: θ>θ0 , where Q(θ) is a monotone function of θ. θ∈R.**

(b)State and prove Generalized Neyman-Pearson lemma.

3. **(a) Let X~f(x,θ) = e-(x-θ) ;x≥ θ**

Test H: θ≤θ0 Vs K: θ>θ0 derive UMP test of size α on the basis of a random sample of size n from f(x,θ).

(b) Derive size – α UMP test to test H: **θ≤θ0** against K: **θ>θ0** based on a random sample of size n taken from uniform distribution with parameter θ. Also obtain power function of the test.

OR

3. (a) Explain difference between parametric and non-parametric test. give the advantage of non-parametric tests.

(b) Explain (i) (ii) unbiased test (iii) , locally most powerful test (iv) Monotone likelihood ratio

4. (a)Explain wilcoxon signed Rank test with illustration

(b) Let $X_1, X_2 \ldots X_n$ be a random sample of size n from an exponential distribution with pdf.

$$F(x,\theta) = \frac{1}{\theta} e^{-x/\theta}, x > 0, \theta > 0$$

,Where, $0 < \theta < \infty$. Define the UMP test of size α for testing $H_0: \theta \leq \theta_0$ vs k: $\theta > \theta_0$. Also find the power function of the test.

OR

4. (a) State the properties of NP lemma.

(b) Let $X \sim P(\lambda)$, $\lambda > 0$. Define $\phi(x) = e^{-x}$, $x \in \mathcal{X} = \{0, 1, 2 \ldots\}$ & $H : \lambda = \lambda_0$ Vs $K : \lambda = \lambda_1$ then what is the size & power of the test?

5. (a) . (a). Describe kolmogrove smirnov test.

(b) Describe Mann Whitney –U test.

OR

5. (a) Derive SPRT for Bernoulli distribution with parameter to test H: $p = p_0$ against K: $p = p_1 = 1 - p_0$. Obtain its OC and ASN functions

(b) (a) Show that the SPRT terminates with probability one

www.mkbuonline.com